CASE REPORTS

Refer to: Keys TF: Sternal-costal infection with pseudomonas—A complication of drug abuse. West J Med 120:72-73, Jan 1974

Sternal-Costal Infection with Pseudomonas

A Complication of Drug Abuse

THOMAS F. KEYS, MD, *Rochester, Minnesota*

THE ABUSE CREATED by the self-administration of parenteral drugs, most notably narcotics, is associated with serious medical problems.[1,2] Well recognized systemic complications which arise from the injection of infectious agents include bacterial and yeast endocarditis, pulmonary abscesses, viral hepatitis and malaria. Systemic injection of particulate matter may cause pulmonary edema, pulmonary fibrosis, necrotizing angiitis with aneurysms[3] and chronic active liver disease.[4] Local infections that may occur as well include skin abscesses, phlebitis and the dreaded complication of tetanus.

Not so well recognized are pyogenic infections of the bones and joints. However, recent reports indicate that this complication is more common than was formerly appreciated. In 1971 four heroin addicts were reported with hematogenous osteomyelitis.[5] The vertebral column was involved in three patients and the clavicle in the fourth. Since 1967 Fisbach et al[6] have noted a greater prevalence of Gram-negative bacteria over Staphylococcus aureus in causing vertebral osteomyelitis. Five of the 15 patients in their series were intravenous heroin users. Septic arthritis is also being seen with increasing frequency. Involvement has included the knee, sternoclavicular, achromioclavicular and costochondral joints.[7,8] Pseudomonas aeruginosa appears to be the most common etiologic agent in these cases. Within the past year we have seen two patients with sternal-costal infections caused by this microorganism. It is important to recognize the location of this infection since adequate surgical removal of infected tissue may be required for cure.

From the Section of Infectious Diseases, Department of Medicine, Veterans Administration Hospital, Sepulveda, and the University of California, Los Angeles, School of Medicine.

Submitted March 26, 1973.

Reprint requests to: T. F. Keys, MD, Division of Infectious Diseases and Internal Medicine, Mayo Clinic, Rochester, MN 55901.

Reports of Cases

CASE 1. A 23-year-old man who had been an intravenous methedrine user for one year was readmitted to the hospital in July of 1971 with complaint of progressive painful swelling over the left mid-sternal area since "shooting up" a month previously. Two weeks earlier, an injection of steroid (40 mg Depo-Medrol® in 1 percent xylocaine) into the sternal-costal junction of the third rib had failed to relieve his symptoms. On examination, the patient was afebrile and in no acute distress. His weight was 62 kg. A tender raised mass was noted overlying the mid-sternum and spreading beyond the costochondral junction of the third rib. No drainage or induration was evident. The hemoglobin was 13.9 grams per 100 ml of blood and the leukocyte count was 9,400 per cu mm with a normal differential. The erythrocyte sedimentation rate (Westergren) was 14 mm in one hour. An x-ray film of the chest was normal except for a soft tissue swelling overlying the sternum. Additional views of the sternum demonstrated a destructive process in the upper body with sequestered fragments within the area. The patient was taken to surgery and an incision was made over the sternum across the third rib. Necrotic tissue was encountered extending from the pectoralis muscle through the costochondral cartilage into the sternum. The area was thoroughly debrided, irrigated and packed open with drainage tubes. Cultures of bone, cartilage and muscle grew Pseudomonas aeruginosa. Minimal inhibitory concentrations (MIC's) were 50 micrograms of carbenicillin and 0.78 micrograms of gentamicin per milliliter. Sodium carbenicillin was administered

as an irrigation solution into the wound area for four days. Additionally, the patient received intravenous sodium carbenicillin, 4 grams every four hours for two weeks, and intramuscular gentamicin sulfate, 80 mg every eight to twelve hours for six weeks. Serum creatinine values remained in the normal range during and following therapy. The wound healed completely and when the patient was last seen six months later, he was entirely asymptomatic. Follow-up sternal x-ray films demonstrated residual boney defects from the operation but no evidence of osteomyelitis.

CASE 2. A 45-year-old man who was addicted to heroin was transferred to the Veterans Administration Hospital in February 1972 with pain and purulent drainage from a partially healed wound overlying the sternal-costal junction of the left third rib. Three months previously he had noted the sudden onset of a painful swelling over the left mid-anterior chest lateral to the sternum. A month later the area was explored under local anesthesia at another hospital. An apparent abscess was encountered between the third and fourth costal cartilages. Twenty milliliters of milky fluid was withdrawn and a culture of it grew Pseudomonas aeruginosa. The patient received gentamicin sulfate, 120 mg intramuscularly every eight hours, a dosage that had to be modified because of progressive azotemia. After 24 days, therapy was discontinued. The patient remained afebrile; however, purulent material that was culturally positive for Pseudomonas aeruginosa continued to drain from the surgical wound. In addition he complained of tenderness at the third rib in the mid-clavicular line. Laboratory studies showed hemoglobin of 14.4 grams per 100 ml of blood, leukocyte count of 7,500 per cu mm with a normal differential, and erythocyte sedimentation rate of 11 mm in one hour. No abnormality was noted on a sinogram through the wound drain. An x-ray film of the chest was within normal limits. Special views of the sternum showed no abnormality; however, there appeared to be a moderate amount of soft tissue swelling in the region of the costochondral junction and the mid-portion of the third left rib. Under general anesthesia, the region was explored and necrotic cartilage and rib tissue were found. The area was debrided and the wound loosely packed with a gauze dressing. Quantitative cultures of the material grew 10^5 organisms of Pseudomonas aeruginosa per gram of tissue. Histologic sections of bone were consistent with acute osteomyelitis. MIC's to the isolate were, for carbenicillin 100 micrograms per milliliter, for gentamicin 3.12 mg per ml. The patient weighed 60 kg and his baseline serum creatinine was 0.8 mg per 100 ml. He was treated with sodium carbenicillin, 5 grams every four hours for four weeks by intravenous route, and gentamicin sulfate, 60 mg intramuscularly every eight to twelve hours for four weeks. No reduction in serum creatinine or uninary creatinine clearance occurred following therapy. The wound healed and, when last seen in our clinic 12 months later, the patient had no evidence of recurrence.

Discussion

This report of two patients with sternal-costal infection due to Pseudomonas aeruginosa expands the growing list of bone and joint infections following parenteral drug abuse. Although both patients complained of local anterior chest pain and swelling, there was little evidence of systemic infection at the time they were seen. Temperatures and routine laboratory studies were normal except for slight elevations of the erythrocyte sedimentation rate. Routine chest x-ray studies showed no abnormality but special views of the sternum were helpful in determining the source of infection. At thoracotomy the extent of bone, cartilage and muscle involvement was surprising in view of the apparent benign clinical picture. Treatment consisted of wide excision of devitalized tissue and prolonged systemic chemotherapy.

Summary

Sternal-costal infections due to Pseudomonas aeruginosa developed in two patients who were intravenous drug users. Extensive surgical debridement and systemic chemotherapy with carbenicillin and gentamicin brought about a cure in both.

REFERENCES

1. Louria DB, Hensle T, Rose J: The major medical complications of heroin addiction. Ann Int Med 67:1-22, Jul 1967

2. Cherubin, CE: The medical sequelae of narcotic addiction. Ann Int Med 67:23-33, Jul 1967

3. Citron BP, Halpern M, McCarron M, et al: Necrotizing angiitis associated with drug abuse. N Engl J Med 283:1003-1010, Nov 5, 1970

4. Cherubin CE, Rosenthal WS, Stenger RE, et al: Chronic liver disease in asymptomatic narcotic addicts. Ann Int Med 76: 391-396, Mar 1972

5. Holzman RS, Bishko F: Osteomyelitis in heroin addicts. Ann Int Med 75:693-696, Nov 1971

6. Fishbach RS, Dahlgren JG, Rosenblatt JE: Vertebral osteomyelitis due to gram-negative bacteria. Twelfth Interscience Conference Antimicrobial Agents Chemotherapy Sep 1972, p 93

7. Tindel JR, Crowder JG: Septic arthritis due to Pseudomonas aeruginosa. JAMA 218:559-561, Oct 25, 1971

8. Madhavan T. Salahuddin N, Fisher E, et al: Pseudomonas osteomyelitis in young narcotic addicts. Twelfth Interscience Conference Antimicrobial Agents Chemotherapy Sep 1972, p 93